A.8 Greater Sandhill Crane (*Grus canadensis tabida*)

A.8.1 Legal Status

The greater sandhill crane (*Grus canadensis tabida*) is listed as a state-threatened species under the California Endangered Species Act (Fish and Game Code, Sections 2050 et seq.). The species was listed by the California Fish and Game Commission in 1983. The greater sandhill crane is also designated as a state Fully Protected species.

The greater sandhill crane has no federal regulatory status.

A.8.2 Species Distribution and Status

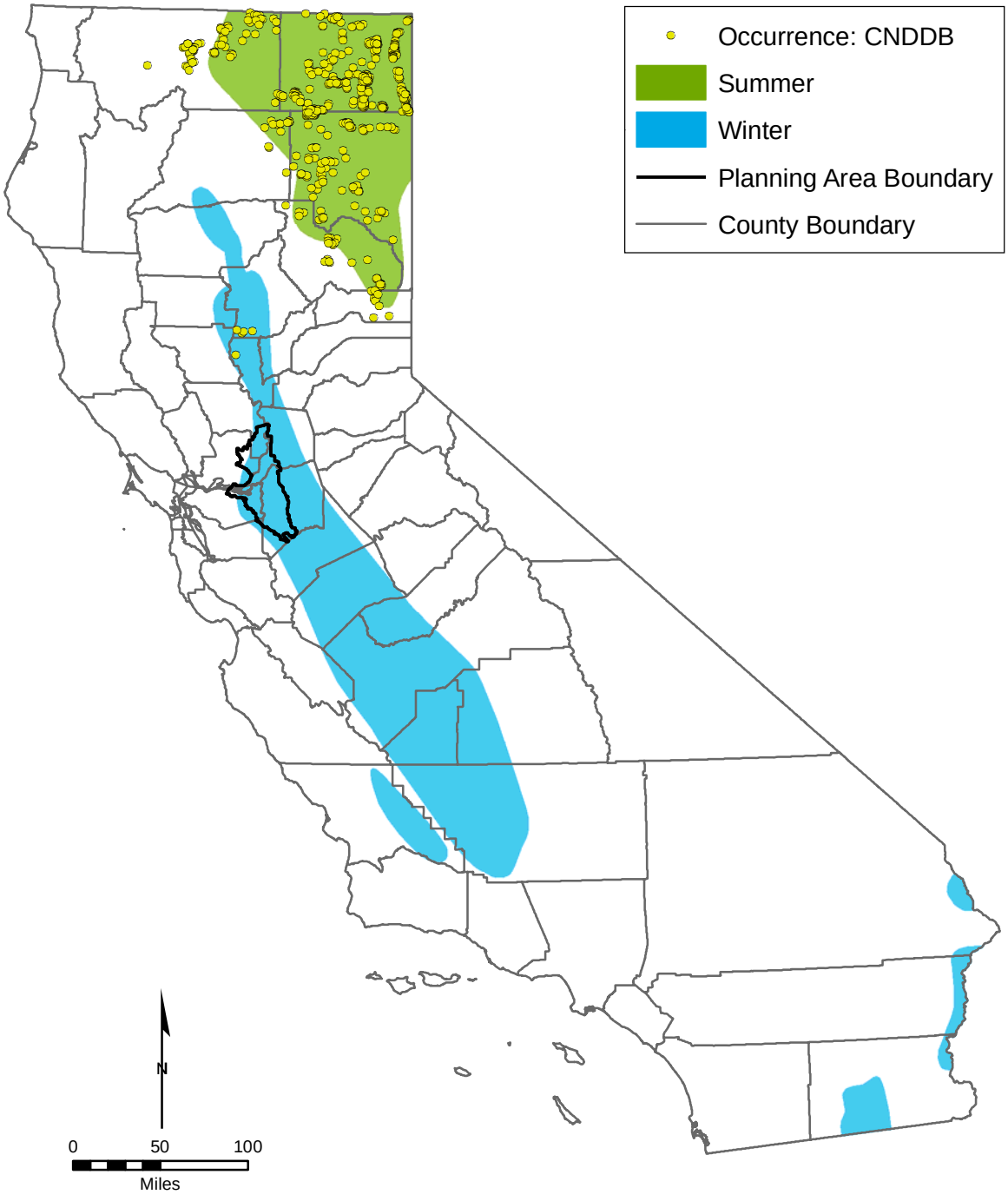
Range and Status

The greater sandhill crane is one of six subspecies of sandhill crane in North America; three of which are non-migratory and occupy ranges in the southeastern United States and Cuba (Littlefield and Ivey 2000). The remaining three are migratory and include the lesser and greater subspecies, both of which are further divided into distinct populations. The greater sandhill crane is divided into five migratory populations, which return to the same breeding territory and wintering sites each year. These include: the Eastern Population, the Prairie Population, the Rocky Mountain Population, the Lower Colorado River Population, and the Central Valley Population. The Central Valley Population breeds in northeastern California (Figure A.8.1), central and eastern Oregon, southwestern Washington, and southern British Columbia; and winters in the Central Valley of California (Littlefield and Ivey 2000).

Breeding Range. There are an estimated 500,000 sandhill cranes in North America, of which an estimated 62,600 are greater sandhill cranes. An estimated 8,500 of these belong to the Central Valley Population (Littlefield and Ivey 2000). The most recent breeding surveys have recorded 1,151 breeding pairs in Oregon, 465 breeding pairs in California, 20 pairs in Washington, and 11 pairs in Nevada (Engler and Brady 2000 as cited in Ivey and Herziger 2001, Ivey and Herziger 2000, Ivey and Herziger 2001). The exact number of breeding pairs in British Columbia remains unknown; however, Littlefield and Ivey (2000) estimate approximately 2,500 individuals.

Within California, the breeding distribution is restricted to a six-county area in the northeastern corner of the state, including Siskiyou, Modoc, Shasta, Lassen, Plumas, and Sierra Counties (Figure A.8.1) (Littlefield 1982, Littlefield 1989, Ivey and Herziger 2001). Ivey and Herziger (2001) conducted the most recent surveys and found that the greatest number of breeding pairs are in Modoc County (54 percent) followed by Lassen County (26 percent). A total of 91 percent of the breeding pairs were found in Modoc, Lassen, and Siskiyou Counties (Ivey and Herziger 2001).

Prior to the early 1970s, survey efforts were insufficient to accurately estimate the breeding population of greater sandhill crane; however, major population declines have been noted and attributed to the widespread destruction of essential wetland habitats between 1870 and 1915 (Walkinshaw 1949). The first comprehensive surveys were conducted in 1971 (112 pairs), followed by surveys in 1981 (129 pairs) and 1988 (170 pairs), indicating a positive trend in the breeding population during that period (Littlefield 1982, Littlefield 1989). The next subsequent,



Source: California Department of Fish and Game, WHR, 2006.
California Department of Fish and Game, CNDDB, 2008.

Figure A.8.1. Greater Sandhill Crane Statewide Range and Recorded Occurrences

and most recent survey was conducted in 2000 (Ivey and Herziger 2001) when 465 pairs were reported, an increase of 68 percent since the 1988 survey. Much of this increase may be attributable to protection of traditional nesting areas on state and national wildlife refuges, lack of hunting, and a variety of management practices.

Wintering Range. Pogson and Lindstedt (1991) identified eight distinct wintering locations in the Central Valley from Chico/Butte Sink on the north to Pixley National Wildlife Refuge near Delano on the south, with over 95 percent occurring within the Sacramento Valley between Butte Sink and the Sacramento-San Joaquin River Delta (Figure A.8.1). Use varies seasonally within this area probably as a function of the winter flooding regime and food resources. The Butte Sink has been reported to support a large segment of the population (>50 percent) during October and November. Use then shifts to the Delta and the Cosumnes River floodplain during December and January, where an estimated two-thirds of the population resides the remainder of the winter (Pogson and Lindstedt 1988, Littlefield and Ivey 2000).

The first exhaustive winter survey was conducted in the mid-1980s (Pogson and Lindstedt 1988), which estimated a wintering population of 6,000 birds. This was adjusted in the early 1990s to 8,500 birds as a result of additional follow-up survey work in the Sacramento Valley (Littlefield 1993). Although portions of the wintering population have been monitored periodically prior to and since the mid-1980s, no other comprehensive survey has been conducted and information has been insufficient to reliably detect trends.

Distribution and Status in the Planning Area

Figure A.8.2 illustrates the distribution of the greater sandhill crane in the BDCP Planning Area. The entire Delta winter range of the species (defined here as including the Delta and Cosumnes River floodplain), as defined by Pogson and Lindstedt (1988) and Littlefield and Ivey (2000), occurs within the BDCP Planning Area with the exception of the eastern portion of the Cosumnes River floodplain area. Greater sandhill cranes begin arriving in the Delta in October and from 3,000 to 4,000 cranes are in the Delta region in October and November. As noted above, the population peaks in December and January as cranes move into the Delta from the Butte Basin. An estimated two-thirds (from 5,000 to 6,000 cranes) of the population resides in the Delta the remainder of the winter (Pogson and Lindstedt 1988, Littlefield and Ivey 2000).

While populations have shifted over the years in response to changing agricultural patterns, particularly the increase of vineyards, the islands and tracts traditionally receiving the highest crane use include Staten Island, Terminous Island, Canal Ranch, and New Hope Tract. Other areas receive less and from occasional to regular use including Bouldin Island, Empire Tract, King Island, Grand Island, Tyler Island, Ryer Island, Brannan Island, Twitchell Island, Bradford Island, Venice Island, Manderville Island, and Webb, Holland, and Palm Tracts (Pogson 1990, Littlefield and Ivey 2000).

The Cosumnes River floodplain, much of it protected within The Nature Conservancy's Cosumnes River Preserve, also supports significant winter crane use. Use may have increased in this area as continued conversion to vineyards on Delta Islands has reduced habitat availability in that area (Littlefield and Ivey 2000).

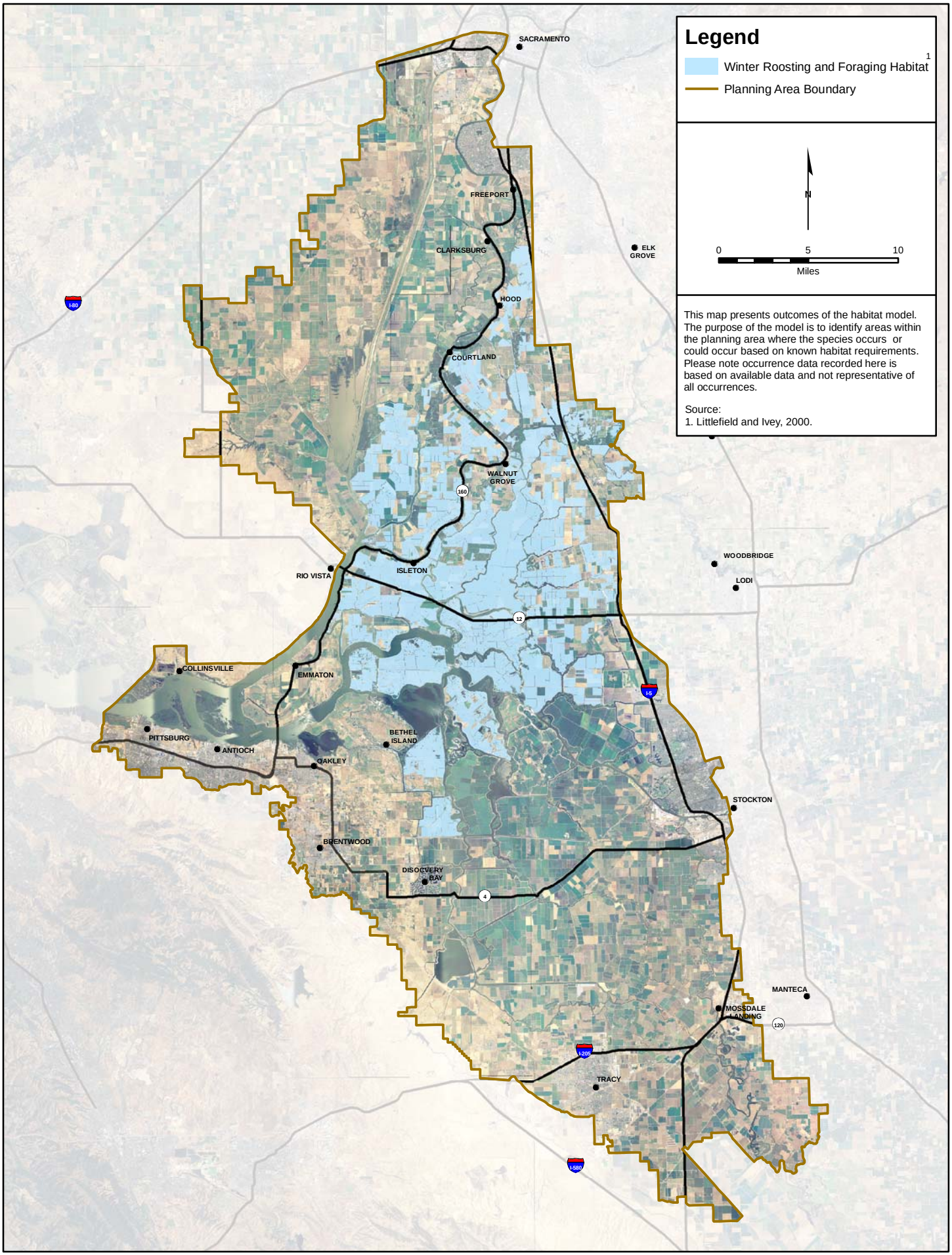


Figure A.8.2. Greater Sandhill Crane Habitat Model and Recorded Occurrences

As noted, crane use is entirely dependent on agricultural crop patterns. Conversion to unsuitable crop types effectively eliminates crane habitat. Over the last two decades, a substantial amount of conversion to vineyards has occurred on Delta Islands and is considered among the most important conservation issues for greater sandhill crane (Littlefield and Ivey 2000). Several important traditionally used areas, such as portions of the Thompson-Folger Ranch along Peltier Road have been converted to vineyards. Habitat loss from agricultural conversion and disturbances from increasing recreational activities in some areas threaten the long-term sustainability of key wintering areas for this species.

A.8.3 Habitat Requirements and Special Conditions

Greater sandhill cranes are primarily birds of open freshwater wetlands. In California, nesting typically occurs in open grazed meadows. Most of these are bulrush or sedge meadows adjacent to grassland or short vegetation uplands (Littlefield and Ryder 1968, Littlefield 1982). While breeding sites occur on state and federal refuges or U.S. Forest Service lands, more than 60 percent occur on private lands (Ivey and Herzinger 2001).

Wintering habitat is found almost entirely in agricultural fields and edges. Wintering habitat consists of three primary elements: foraging habitat, loafing habitat, and roosting habitat. There are two principal foraging habitat types used during winter. In the Delta, harvested corn fields are the most commonly used foraging habitat along with winter wheat, alfalfa, pasture, and fallow fields (Pogson and Lindstedt 1988). Ivey (pers. comm. in Sacramento County 2008) rated foraging habitat cover types in the Delta region in the following order of importance to greater sandhill cranes: harvested corn, winter wheat, irrigated pasture, and alfalfa fields. In the Butte Basin, harvested rice fields are the most commonly used foraging habitat along with winter wheat, harvested and unharvested corn, fallow fields, and grasslands (Pogson and Lindstedt 1988, Littlefield 2002).

Loafing generally occurs mid-day when birds loosely congregate along agricultural field borders, levees, rice-checks, ditches, or in alfalfa fields or pastures. Cranes will often loaf in rocky uplands or along gravel roads where they collect grit, which is important in the digestion of grain seeds. During the late afternoon and evening, cranes begin to congregate into large, dense communal groups where they remain until the following morning. Providing protection from predators during the night, roost sites are typically within two to three miles from foraging and loafing areas and thus available roosting sites are an essential component of winter habitat. Roosting habitat typically consists of shallowly flooded open fields of variable size (1 to 300 acres) or wetlands interspersed with uplands. Water depth is important and averages 4.5 inches. Littlefield (1993) reported cranes abandoning roosting sites when water depth reached 8 to 11 inches. He recommended roost sites be a minimum of 20 acres in size with water maintained from early September to mid-March. If properly managed, roost sites are often used for many years.

Greater sandhill cranes are considered intolerant of excessive human disturbances and the level of disturbance may play a role in habitat selection (Lovvorn and Kirkpatrick 1981).

Excessive disturbance have caused cranes to abandon foraging and roosting sites, and repeated disturbance may affect their ability to feed and store energy needed for survival. Ivey and Herziger (2003) documented disturbance of greater sandhill cranes on Staten Island, a high use area, and found that aircraft, vehicles, hunting, and recreational activities (e.g., birding, walking, horseback riding, bicycling, boating) can cause cranes to run or fly away. Ivey (pers. comm. in

Sacramento County 2008) found that cranes generally avoid suitable agricultural foraging habitat near occupied dwellings, and foraging areas within 100 yards of occupied dwellings should not be considered suitable (Sacramento County 2008).

A.8.4 Life History

Description. The greater sandhill crane is the largest of the six sandhill crane subspecies. It stands up to 4.9 feet and has a wing span from 5.9 to 6.9 feet. Adult males and females are similar in appearance with gray plumage, whitish face, chin, and upper throat, and a bare red forehead and crown. Greater sandhill cranes sometimes preen iron-rich mud into their feathers leaving a rusty-brown hue that can last throughout the summer months and sometimes remains detectable during the early winter. Juveniles are easily detectable through their first winter by their smaller size and cinnamon-brown plumage, which changes to gray during their first year (Tacha et al. 1992).

Seasonal Patterns. Nesting generally begins in April and May and extends from July through August. By September, the Central Valley population begins their migration and arrives onto the wintering grounds by late September, where they remain until approximately late February to early March, when they begin their northward migration back to the breeding grounds (Pogson 1990, Tacha et al 1992). Local winter movements continue throughout the winter season in response to changes in flooded habitat and available food resources. For example, Pogson and Lindstedt (1988) and Littlefield (2002) report extensive use of the Butte Basin during the early part of the winter season in October and November and movement of a large segment of the population into the Delta during December and January.

Nest Site Selection. Nesting areas are selected on the basis of meadow size, flooding regime, condition of meadow and presence of cattle, vegetation composition, available food resources, and proximity to human disturbances (Armbruster 1987). Nests are usually constructed as mounds in shallow water (usually less than 12 inches deep), usually in wetland vegetation. The nest is constructed by plucking and stacking the dominant vegetation in the nesting area to form a mound. These are often very large, 2 to 3 feet-high and up to 6 feet in diameter. They often use all of the vegetation from several feet around the nest creating a distinctive circular unvegetated ring around the nest mound (Smith 1999). Nests are also constructed on dry ground.

Reproduction. Females usually lay two eggs. Both the male and female incubate the eggs, which lasts from 29 to 32 days. One or two young fledge from successful nests. Young fledge at 67 to 75 days. Juveniles remain with the adults during the first year in family groups and do not disperse until they return to the breeding areas the following year (Tacha et al. 1992).

Foraging Behavior and Diet. Sandhill cranes are omnivorous and search for subsurface food items by probing with their bill. They also glean seeds and other foods on the surface (Walkinshaw 1973, Tacha 1987).

Diet consists of tubers, seeds, grains (particularly corn and rice), small vertebrates (e.g., mice and snakes) and a variety of invertebrates.

Home Range/Territory Size. Ivey and Herziger (2003) estimated average winter home range sizes of greater sandhill cranes in the Delta to be 0.66/square miles, varying from 0.07 to 2.12 square miles. Average distance between roost sites and feeding areas was estimated by Pogson (1990) to be 1.74 miles and by Ivey and Herziger (2003) to be 0.88 miles (range 0.17 to 1.89 miles).

A.8.5 Threats and Stressors

On the breeding grounds, threats include changes in water regime that lowers the water table and eliminates nesting areas; cattle grazing that can degrade habitat, destroy nests, and disturb nesting birds; and mowing and haying operations that can kill young cranes.

Threats on the wintering grounds include changes in water availability; flooding fields for waterfowl, which reduces foraging habitat for cranes; conversion of cereal cropland to vineyards or other incompatible crop types; human disturbances; collision with power lines and other structures; disease; and urban encroachment (Littlefield and Ivey 2000).

Habitat Loss and Alteration. The most significant threat to wintering greater sandhill cranes is the loss of traditional winter habitat from urbanization and agricultural conversion. While relatively limited urbanization has occurred to date within key crane areas, surrounding development and increased levels of human disturbances may threaten the long-term sustainability of important wintering lands. In the Delta region, the conversion of suitable agricultural foraging and roosting habitats to unsuitable cover types, particularly orchards and vineyards, has removed key habitats and altered the distribution and behavior of wintering greater sandhill cranes.

Disturbance of Foraging and Roosting Areas. Greater sandhill cranes are sensitive to human presence and do not tolerate regular disturbances, including low-level recreational disturbances. Types of disturbances include hunting, birding, photography, operating equipment for habitat management, boating, and aircraft. Disturbances cause birds to abandon otherwise suitable habitats, and may cause birds to deplete important energy stores needed for survival during wintering and migration. Only one pre-dawn disruption is usually necessary before cranes abandon a site (Littlefield and Ivey 2000). Disturbance from hunting also poses a threat to cranes. Hunters accessing hunt areas during pre-dawn hours flush cranes from their roosts and hunter presence can keep cranes from roosting or foraging in an area (Ivey and Herziger 2003). Flooding of agricultural fields for waterfowl hunting also reduces available foraging habitat for wintering cranes.

A.8.6 Relevant Conservation Efforts

Several significant efforts have been made to protect and enhance wintering habitat for greater sandhill cranes. In 1985, the California Department of Fish and Game has acquired and continues to manage the Woodbridge Ecological Reserve. Purchased specifically to manage as a crane roosting area, this site has been a traditional crane roost for decades and continues to be one of the most important crane roosts for this wintering population.

Management of Staten Island has also provided substantial benefit to greater sandhill cranes. The island has been managed for several decades to provide benefit to wildlife in conjunction with agricultural production. Crane use of the island has increased particularly since the 1980s and 1990s under the successful management of the private landowners and continues to be among the most significant crane use areas in the Delta (Littlefield and Ivey 2000). In 2002, The Nature Conservancy established the Conservation Farms and Ranches program to provide oversight management of Staten Island and to ensure long-term conservation of crane habitat on the island.

Beginning in 1984, The Nature Conservancy also began acquiring lands that today encompass approximately 40,000 acres on the Cosumnes River Preserve. Portions of the preserve are managed specifically for winter crane use and have attracted up to 20 percent of the greater

sandhill crane wintering population at certain times of the wintering season (Littlefield and Ivey 2000).

A.8.7 Species Habitat Suitability Model

Winter Roosting and Foraging Habitat: Greater sandhill crane winter roosting and foraging habitat includes all managed seasonal wetlands, all natural seasonal wetlands, all rice lands, pasturelands, hay crops, and annually rotated agricultural crops beyond 100 yards of occupied dwellings that occur within the defined winter range. Natural vegetation types designated as species habitat in this model correspond to the mapped vegetation associations in the BDCP GIS vegetation data layer. Agricultural crop types designated as species habitat correspond to Department of Water Resources GIS land use database categories.

Assumptions: Greater sandhill crane does not breed in the BDCP Planning Area, but the BDCP Planning Area contains one of the most important wintering areas of this state threatened species (Figure A.8.2) (Pogson and Lindstedt 1988). The Delta winter range is defined by traditional use areas as described by Pogson and Lindstedt (1988, 1991) and most recently mapped by Littlefield and Ivey (2000). The Littlefield and Ivey (2000) map along with modifications based on recent crane use in the Stone Lakes area, is used here to define the geographic winter range of the species within the BDCP Planning Area. Throughout their wintering range in the Delta, they roost in shallowly flooding seasonal wetlands and forage primarily in harvested corn fields, winter wheat fields, alfalfa fields, seasonal wetlands, irrigated pastures, and grasslands (Pogson and Lindstedt 1988, 1991, Littlefield and Ivey 2000). Ivey (pers. comm.) found that cranes generally avoid suitable agricultural foraging habitat near occupied dwellings, and foraging areas within 100 yards of occupied dwellings should not be considered suitable (Sacramento County 2008). Suitable foraging habitat is likely also a function of patch size. However, because there is insufficient data on winter habitat patch size and because in general field size within the Delta winter range are probably sufficiently large to support foraging cranes, all suitable cover types are considered suitable irrespective of patch size. Because other annually rotated crop types could convert to a more suitable cover type in any given year, these crop types (e.g., annually rotated row and grain crops) are also included here as potentially suitable habitat.

A.8.8 Recovery Goals

In 1997 the California Endangered Species Act was amended, explicitly requiring the California Department of Fish and Game to develop a recovery strategy pilot program for the greater sandhill crane (DFG 2001). A recovery strategy team was assembled with representatives from state and federal agencies, local landowners, environmental groups, and species experts, and produced a draft of a recovery strategy. The strategy included long-term recovery goals, and a range of alternative management goals and activities. The overall goal was to improve the status of the species through a variety of specific habitat protection and other actions so the protections of CESA are no longer necessary, and therefore, delisting can be proposed (DFG 2005). The draft recovery strategy has not been finalized or implemented.

The CALFED Bay-Delta Ecosystem Restoration Program Plan's Multi-Species Conservation Strategy designates the greater sandhill crane as "Contribute to Recovery" (CALFED Bay-Delta Program 2000). This means that CALFED will undertake actions under its control and within its scope that are necessary to recover the species. Recovery is equivalent to the requirements of delisting a species under federal and State ESAs.

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